

App. No.: 10/009555
Filed: October 26, 2001
Conf. No. 4606

Page 2 of 8

IN THE CLAIMS

1. (Currently Amended) A pushing type of electric motor-operated wheelchair, a frame provided with a seat for a patient, at least one wheel journaled by said frame and driven by an electric motor carried by said frame, a bar handle extending upward from a rearward portion of said frame and having a cross piece of a double member structure consisting of a fixed member attached to and extending transversely across said frame and an external member disposed along at least at least a substantial portion of the length of an upper side portion of said fixed member and supported for limited movement relative thereto and to which an assistant applies a force to move said wheelchair; a detecting means interposed between said fixed member and said external member to detect control information based on an external force applied by the assistant to said external member to move said wheelchair, and a control means for controlling said electric motor to produce assisting power commensurate with the control information detected by said detecting means.

B1
2. (Currently Amended) A pushing type of electric motor-operated wheelchair according to claim 1, wherein the detecting means detects comprises a displacement detecting means for detecting control information, namely relative displacement between the fixed member and the movable external member, and the control means is provided to control controls the electric motor to produce assisting power commensurate with the detected displacement.

3. (Currently Amended) A pushing type of electric motor-operated wheelchair according to claim 2, wherein the displacement detecting means is disposed in the center, with respect to the wheelchair width, of at least one of the fixed member and the movable external member, and guides are provided on right and left sides of said displacement detecting means to restrict up and down movements and to permit forward and reverse movements of said movable external member relative to said fixed member.

4. (Currently Amended) A pushing type of electric motor-operated wheelchair according to claim 2 wherein the displacement detecting means is disposed in the center, with respect to the wheelchair width, of at least one of the fixed member and the movable external member, and grip members are provided on right and left sides of said movable external member.

5. (Currently Amended) A pushing type of electric motor-operated wheelchair according to claim 4, wherein the right and left grip members are positioned symmetrically apart from the longitudinal centerline of the wheelchair and sloping obliquely up inward to the center in the wheelchair width direction from right and left ends.

App. No.: 10/009555
Filed: October 26, 2001
Conf. No. 4606

Page 3 of 8

6. (Currently Amended) A pushing, ~~type-of~~ electric motor-operated wheelchair according to claim 2 wherein the ~~assist-power-controlling means~~ control controls the electric motor to move forward according to the magnitude of the relative displacement between the fixed member and the movable member caused by pressing the upper side portion of the bar handle, and controls the driving motor to move backward when a separately provided first operator is turned on.

B1
7. (Currently Amended) A pushing, ~~type-of~~ electric motor-operated wheelchair according to claim 2, wherein the ~~assist-power-controlling means~~ control controls the electric motor to move forward or backward according to the magnitude of the relative displacement between the fixed member and the movable member of the bar handle, and controls said electric motor to stop irrespective of the value detected with the displacement detecting means when a separately provided second operator is turned on.

8. (Currently Amended) A pushing, ~~type-of~~ electric motor-operated wheelchair according to claim 6 wherein operators selected from the group consisting of comprising a reverse switch, a power switch, and a speed regulation device and displays selected from the group consisting of comprising a power display, a display for indicating the necessity of charging, and an anomaly display are collectively disposed in the center, with respect to the wheelchair width, of the external member of the bar handle.

9. (Currently Amended) A pushing, ~~type-of~~ electric motor-operated wheelchair according to claim 1, wherein the detecting means comprises a load detecting means for detecting the magnitude of the load applied to the external member and the control means controls the electrical motor so as to produce assist power commensurate with the detected load.

10. (Currently Amended) A pushing, ~~type-of~~ electric motor-operated wheelchair according to claim 9, wherein the detecting means comprises a magnetostriction sensor for detecting the load and a magnetostriction sensor for compensating the output from the load-detecting magnetostriction sensor.

11. (Currently Amended) A pushing, ~~type-of~~ electric motor-operated wheelchair according to claim 10, [characterized in that] wherein the load-detecting magnetostriction sensor and the output-compensating magnetostriction sensor are disposed to face each other and a damping member is interposed between the two sensors.

12. (Currently Amended) A pushing, ~~type-of~~ electric motor-operated wheelchair according to claim 10, wherein a load transmitting member for transmitting load to the load-detecting magnetostriction sensor is adjustably attached to the external member ~~in such a manner that for adjustment of its position relative to the load-detecting magnetostriction sensor may be adjusted~~.

App. No.: 10/009555
Filed: October 26, 2001
Conf. No. 4606

Page 4 of 8

13. (Currently Amended) A pushing, type-of electric motor-operated wheelchair according to claim 12, wherein an indicator displays the relative positions of the load transmitting member and the load-detecting magnetostriction sensor.

14. (Currently Amended) A pushing, type-of electric motor-operated wheelchair according to claim 1, wherein the detecting means outputs control information based on the external force acting on the external member in a horizontal direction.

15. (Currently Amended) A pushing, type-of electric motor-operated wheelchair according to claim 1, wherein the external member is provided with a handle cover disposed in the transverse center of the wheelchair width, and further includes right and left grip portions extend respectively in right and left directions from said handle cover, a top surface of said handle cover comprises an operation panel portion, ~~containing at least one switch, on one side in the wheelchair width direction of the handle cover's top surface being depressed below to form~~ said operation panel portion having a depressed part at one side thereof forming a rotary switch placing portion and further including a rotary switch disposed in said rotary switch placing portion.

16. (Currently Amended) A pushing, type-of electric motor-operated wheelchair according to claim 1, wherein the external member is provided with a handle cover disposed in the wheelchair width center, and right and left grip members extend respectively from right and left from said handle cover, a top surface of said handle cover is formed as an operation panel portion, a push switch mounted in a switch hole formed in said operation panel portion and projecting upward from said top surface of said operation panel portion, and a switch circumferential wall formed around said switch hole so as to surround said push switch and lying substantially flush with a top surface of said push switch.

17. (Currently Amended) A pushing, type-of electric motor-operated wheelchair comprising a frame provided with a rearwardly placed push handle, a wheel journalled by said frame, a motor for driving said wheel, a human force detecting means for detecting the amount of human force applied to said push handle when said push handle is pushed forward, an operator control for selectively propelling said wheelchair backward, and a motor control for driving said motor forward in an amount according to the detected value coming from said human force detecting means and for driving said motor backward when said operator is turned on.

App. No.: 10/009555
Filed: October 26, 2001
Conf. No. 4606

Page 5 of 8

18. (Currently Amended) A pushing, type-of electric motor-operated wheelchair comprising a frame provided with a rearwardly placed push handle a wheel journaled by said frame, a motor for driving said wheel, a human force detecting means for detecting human force from relative movement amount when said push handle is pushed forward, a zero point detecting means for outputting a zero point signal when the relative movement amount of said push handle is a specified value, and a motor control means for controlling said motor using a reference value which is the value detected with said human force detecting means when said zero point signal is outputted.

19. (Currently Amended) A pushing, type-of electric motor-operated wheelchair according to claim 18, wherein the motor control means controls the motor according to a first and a second insensible zones, said first insensible zone comprising the area where the relative movement amount of the push handle is smaller than the specified value, and with the second insensible zone greater than the specified value to an upper limit greater than the specified value.

20. (Currently Amended) A pushing, type-of electric motor-operated wheelchair according to claim 19, wherein the motor control means drives the motor forward according to the value detected with the human force detecting means when the detected value is beyond the second insensible zone, makes the output of the motor zero when the detected value is in the second insensible zone, and causes the motor to function as a generator brake when the detected value is in the first insensible zone.

21. (Currently Amended) A pushing, type-of electric motor-operated wheelchair according to claim 17, wherein the push handles are made up of right and left leg portions secured to the frame and extending upward and an operating section interconnecting the upper ends of the right and left leg portions, a movable member supported for back-and-forth relative movement in said operating section, said movable member projecting and retracting back and forth through slits formed in said operating section, and the human force detecting means detects the human force as said movable member moves back and forth.

22. (Currently Amended) A pushing, type-of electric motor-operated wheelchair according to claim 21, wherein right and left movable members are disposed in the right and left grip members of the operating section, said right and left movable members being interconnected through a connecting member, and the human force detecting means detects the relative movement amount of the approximate central portion of said connecting member.

App. No.: 10/009555
Filed: October 26, 2001
Conf. No. 4606

Page 6 of 8

23. (Currently Amended) A pushing, type-of electric motor-operated wheelchair according to claim 17, wherein the push handles are made up of right and left leg portions secured to the frame of the wheelchair and extending upward and grips attached to the top end portions of the respective leg portions, at least one of said right and left grips is capable of relative back-and-forth movement, and the human force detecting means detects the human force from the relative movement amount of the movable grip.

24. (Currently Amended) A pushing, type-of electric motor-operated wheelchair according to claim 7 wherein operators selected from the group consisting of a reverse switch, a power switch, and a speed regulation device and displays selected from the group consisting of a power display, a display for indicating the necessity of charging, and an anomaly display are collectively disposed in the center, with respect to the wheelchair width, of the external member of the bar handle.

25. (Currently Amended) A pushing, type-of electric motor-operated wheelchair according to claim 15 wherein the rotary switch is provided with operation tongue portions projecting toward the grip member.

26. (Currently Amended) A pushing, type-of electric motor-operated wheelchair according to claim 18 wherein the push handles are made up of right and left leg portions secured to the frame of the wheelchair and extending upward and grips attached to the top end portions of the respective leg portions, at least one of said right and left grips is capable of relative back-and-forth movement, and the human force detecting means detects the human force from the relative movement amount of the movable grip.